REMARKS

Claims 1-11 are pending. Claims 6 and 7 have been allowed. Reconsideration and allowance based on the above amendments and following remarks are respectfully requested.

Allowable Subject Matter

Applicants appreciate the indication of claims 6 and 7 as containing allowable subject matter and would be allowed if amended to incorporate their respective independent claims from which they depend. Applicants note that claims 6 and 7 have been amended to incorporate the features of claim 1. Accordingly new independent claims 6 and 7 are in condition for allowance.

Prior Art Rejection

Claims 1-5, 8-11 stand rejected under 35 U.S.C. §103(a) in view of Peyla et al. (US 6,539,063), Huang et al. (EP 0 896 457) and McCorkle et al. (US 6,505,032). This rejection is respectfully traversed.

Applicants submit that Applicants previous arguments filed on April 14, 2008 are still relevant to the present rejection and thus are hereby incorporated by reference. Applicants provide the following additional arguments in addition to the previous arguments.

The present invention is concerned with generating a synchronisation pulse representing a symbol boundary in a signal comprising useful signal periods separated by guard spaces. According to the present invention, as claimed in claim 1:

(1) a first signal is derived dependent upon the relationship between the amplitudes of a pair of samples

(2) a second signal is derived dependent upon the relationship between the phases of the pair of samples;

(3) the first and second signals are combined giving a resultant signal; and

(4) a synchronisation pulse is generated in response to the resultant signal changing in a predetermined manner.

Such processing advantageously provides a clear distinction between guard interval samples and useful symbol period samples, and also particularly clearer distinctions between different ISI interference level regions in the presence of interference caused by multipath reflections, for example. This facilitates frame synchronisation while minimizing such ISI interference.

The Examiner has repeated the objections raised in the last Office Action, and therefore our arguments from the last Office Action are still pertinent as noted above. From the Examiner's response to those arguments, the two main areas of contention with the Examiner concern:

(1) Would a skilled person consider modifying the arrangements in Peyla and Huang in view of McCorkle?

(2) If the answer to question (1) is yes, would the modification result in the claimed invention?

In order to answer these questions, the disclosure of McCorkle needs to be carefully considered.

McCorkle discusses a carrierless ultra wideband (UWB) communication system. As shown in Figure 1a, a received signal is input to a UWB Waveform Correlator 5. As discussed in the passage at lines 35 to 59 of column 7:

> "The UWB waveform correlator 5 correlates the incoming signal (e.g. as modified by any spectral shaping, such as a matched filtering, partially matched filtering , simply roll-off, etc., accomplished in the front-end 3) with different candidate signals generated by the receiver 11, so as to determine when the receiver 11 is synchronized with the received signal and to determine the data that was transmitted.
>
> The timing generator 7 of the receiver 11 operates under the control of the radio controller and interface 9 to provide a clock signal

> that is used in the correlation process performed in the UWB waveform correlator 5. Moreover, in the receiver 11, the UWB waveform correlator 5 correlates in time a particular pulse sequence produced at the receiver 11 with the received pulse sequence that was coupled in through the antenna 1 and modified by front end 3. When the two such sequences are aligned with each other, the UWB waveform correlator 5 provides high signal to noise ratio (SNR) data to the radio controller and interface 9 for subsequent processing. In some circumstances, the output of the UWB waveform correlator 5 is the data itself. In other circumstances, the UWB waveform correlator 5 simply provides an intermediate correlation result, which the radio controller and interface 9 uses to determine the data and determine when the receiver 11 is synchronized with the incoming signal."

So in McCorkle, a timing generator generates a clock signal which is used in the UWB waveform correlator 5 to correlate the received pulse sequence with a particular pulse sequence (candidate pulse sequence) received at the receiver. Although it is not explicitly stated, it appears that the signal to noise ratio (SNR) of the output of the UWB correlator is used to determine when the receiver 11 is synchronised with the incoming signal. McCorkle then states, in the passage from line 60 of column 7 to line 1 of column 8:

> "In some embodiments of the invention, when synchronisation is not achieved (e.g., during a signal acquisition mode of operation), the radio controller and interface 9 provides a control signal to the receiver 11 to acquire synchronisation. In this way, a sliding of a correlation window within the UWB waveform correlator 5 is possible by adjustment of the phase and frequency of the output of the timing generator 7 of the receiver 11 via a control signal from the radio controller and interface 9."

Accordingly, the phase and the frequency of the output of the timing generator is varied in order to acquire synchronisation, but still it appears that only the SNR of the output of the UWB correlator 5 is monitored.

Figure 2 of McCorkle shows a block diagram of a transceiver embodiment in which the received signal is provided to a splitter. As stated at lines 39 to 44 of column 9:

> "The splitter 29 divides the signal up into one of N different signals and applies the N different signals to different tracking correlators 31_1-31_N. Each of the tracking correlators 31_1-31_N receives a clock input signal from a respective timing generator 7_1-7_N of a timing generator module 7, 19, as shown in FIG. 2."

It appears from the passage from line 64 of column 9 to line 6 of column 10 that for each tracking correlator 31 signal acquisition occurs in the same manner as discussed in the passage from line 60 of column 7 to line 1 of column 8 reproduced above. In other words, the SNR of the output of the tracking correlator is monitored.

The reason for the multiple tracking correlators becomes apparent in the passage at lines 24 to 39 of column 10, which states:

> "A feature of the transceiver in FIG. 2 is that it includes a plurality of tracking correlators 31_1-31_N. By providing a plurality of tracking correlators, several advantages are obtained. First, it is possible to achieve synchronisation more quickly (i.e., by operating parallel sets of correlation function arms to find strong SNR points over different code-wheel segments). Second, during a receive mode of operation, the multiple arms can resolve and lock onto different multipath components of a signal. Through coherent addition, the UWB communication system uses the energy from the different multipath signal components to reinforce the received signal, thereby improving the signal to noise ratio. Third, by providing a plurality of tracking correlator arms, it is also possible to use one arm to continuously scan the channel for a better signal than is being received on the other arms."

Each tracking correlator achieves synchronisation by monitoring the SNR of its output as the phase and frequency of its associated timing generator is varied. What is more, as the point of the multiple tracking correlators is to detect different multipath components, it simply does not make sense to use the SNR of the output of one tracking generator to vary the frequency or phase of a timing generator for a different tracking generator.

What McCorkle does mention is synchronising plural tracking correlators to respective different multipath components, and then coherently adding the outputs. This is nothing to do with synchronisation.

(1) Would a skilled person consider modifying the arrangements in Peyla and Huang in view of McCorkle?

In Peyla and Huang, synchronisation is obtained by identifying when data in a guard space in a first signal is temporally aligned with the corresponding matching data in part of the useful period of a second signal which is a time-shifted version of the first signal. In contrast, in McCorkle, synchronisation is obtained by correlating a received signal with a candidate signal which is generated in the receiver. There is no reason to suppose that any advantage would be obtained by modifying the systems discussed in Peyla and Huang in view of McCorkle.

Therefore, Applicant submits the answer to question (1) is **no**.

(2) If the answer to question (1) is yes, would the modification result in the claimed invention?

As explained above, McCorkle does not teach or suggest varying the timing signal for one tracking correlator using the outputs of more than one tracking correlators. McCorkle simply teaches obtaining and maintaining synchronisation of a correlator by monitoring the SNR at the output of a correlator. Given this, it is submitted that McCorkle would not suggest to the skilled person to combine the disclosures of Peyla and Huang in a manner such as to arrive at the claimed invention.

Therefore the Applicant submits that the answer to question (2) is **no**.

On page 3 of the Office Action, the Examiner states:

> "It seems inconceivable that one of ordinary skill in the art would have two synchronization schemes in parallel and then use only one, when combining would obviously result in a more robust method."

But McCorkle does not disclose synchronisation schemes in parallel, but rather discloses having parallel channels with each channel having their own synchronisation scheme. As discussed in the passage at lines 24 to 39 of column 10 of McCorkle reproduced above, the plurality of channels in McCorkle are independently synchronised for three good reasons, namely:

1. To achieve synchronisation more quickly by using different correlators to search different code-wheel segments (i.e., to split the search range through plural correlators);

2. To allow different correlators to synchronise with **different** multipath components; and

3. After synchronisation has been achieved, to allow the one correlator to continuously scan for a better signal than is being detected by one of the other correlators.

In view of the above, it is accordingly submitted that claim 1 is allowable. Regarding independent claims 10 and 11, these two claims are allowable for the same reasons as claim 1. Likewise, claims 2, 5, 8 and 9 are distinguished from the cited art for at least the reasons above with respect to their dependent claim 1.

For at least the above reasons, it is submitted that the combination of Peyla, Huang and McCorkle fail to teach each and every feature of independent claims 1, 10 and 11 as required. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

Conclusion

For at least the above reasons Applicants respectfully submit Claims 1-11 are distinguishable over the cited art. Favorable consideration and prompt allowance are earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad J. Billings Reg. No. 48,917 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

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